Abstract Submitted
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Analysis of dark current mechanisms for split-off band infrared detectors at high temperature region[1] Y.F. LAO, D. KURKCUOGLU, P.V.V. JAYAWEERA, S.G. MATSIK, A.G.U. PERERA, Georgia State University — An analysis of dark current mechanisms has been performed on high-operating-temperature (140-330K) split-off (SO) band infrared detectors based on p-GaAs/AlGaAs heterojunction structures. In contrast to tunneling and thermionic emission at low temperatures, carrier spreading effects due to drift-diffusion transportation dominate the main source of dark current for SO detectors working at high temperatures. The barrier height of heterojunction plays a critical role in determining a transition temperature for the alternation of dark current channels and operating temperatures of SO detectors. Current spreading effects induce non-uniformity of R0A as measured on devices with different mesa sizes. A theoretical model is used to explain experimental current-voltage curves and optimize device uniformity such as using high doping of p-GaAs region, high barrier height etc.

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